

REMARKS/ARGUMENTS

The Office Action mailed May 20, 2003 has been reviewed and carefully considered. Claims 1-10 are canceled. Claims 11, 13, 14, and 18 have been amended. Claims 11-20 are pending in this application, with claims 11 and 14 being the only independent claims. Reconsideration of the above-identified application, as herein amended and in view of the following remarks, is respectfully requested.

In the Office Action mailed May 20, 2003, claims 14 and 16 stand objected to for various informalities noted by the Examiner. Claims 14 and 16 are amended in accordance with the Examiner's suggestions to correct the deficiencies. In view of the amendment and remarks, the objections should now be withdrawn.

Claims 11 - 13 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite because the Examiner states that is unclear whether the "mouth region" recited in step d) of claim 11 is the mouth region of the mold or the mouth region of the nozzle. Step d) of claim 11 now specifically recites --a mouth region of the mold at a slab exit end of the mold--. It is respectfully submitted that this clearly indicates that the mouth region is part of the mold. In view of the above remarks, claim 1 is not indefinite and the rejection of claim 11 under 35 U.S.C. §112, second paragraph should be withdrawn.

Claims 11-20 stand rejected under 35 U.S.C. §103 as unpatentable over U.S. Patent No. 4,811,779 (Streubel) in view of U.S. Patent No. 4,955,428 (Schrewe).

Before discussing the cited prior art and the Examiner's rejections of the claims in view of that art, a brief summary of the present invention is appropriate. The present invention is directed to an apparatus and method for producing thin slabs. According to the present invention, a mold for producing thin slabs includes two opposing broad faces 21 and two opposing narrow

faces 22. Each of the broad faces 21 includes a central part 23 and two side parts 24, 25. From an upper part of the mold to a distance from the upper part of the mold (i.e., a charging region of the mold), the central parts 23 run conically toward each other in the strand conveying direction (p. 7, line 23 to pg. 8, line 4). Transition parts 26 and 27 in the shape of wedges are arranged between the central part 23 and the side parts 24, 25 of the broad faces 21, respectively, in the charging region of the mold.

In the section of the mold from the end of the charging region to the mouth at the strand exit end of the mold, the broad faces 21 and narrow faces 22 maintain the same cross section (see pg. 8, lines 14-17). Therefore the lower region of the mold corresponds to the strand format at the mouth of the mold. This reduces the load on the strand shall in the guiding rollers downstream of the mold and minimizes the risk of longitudinal cracks and break-outs (see pg. 3, lines 8-12). In addition this form allows simple introduction and delivering of the cold strand when starting up the continuous cast installation. (pg. 4, lines 10-12).

Furthermore, the guiding rollers downstream of the mold include split rollers including central roller 43 and side rollers 44, 45 arranged at an angle relative to each other.

Independent claims 11 and 14 have been amended to clarify that the immersion nozzle is "spade-shaped" and that the tapered transition parts are "wedge-shaped". Support for these amendments is in the specification at page 8, lines 5-8 and page 9, line 22. Furthermore, claims 11 and 14 are also amended to clarify that the side surfaces of the broad face of the mold are tapered up to the narrow faces (See Figs. 1 and 2). New claims 21 and 22 recite that the portion of the mold below the transition parts has a cross section that corresponds to the cross section at the strand outlet side of the mold.

Streubel fails to disclose (1) the claimed configuration of the mold and (2) that the cast strand has a convexity. Streubel discloses a mold for continuous casting of steel strip having an upper section (a), a mid section (b), and a lower section (c) as shown in Figs. 2 and 3. Each of the upper and lower sections (a) and (c) have a constant cross-section. The upper section is bulged in the middle and the lower section is parallel-piped. The bulge in the mold of Streubel is in the middle portion of the broad side of the mold and does not extend to the narrow sides of the mold. Accordingly, Streubel fails to disclose the claimed mold shape which now expressly requires that the side surfaces of the broad face of the mold taper to the narrow sides. Furthermore, Streubel fails to disclose that the strand outlet includes the convex cross section. Rather, Streubel discloses that the cross section of the strand at the mold outlet is parallelepiped (see lines 9-10 of the Abstract and Fig. 1).

Furthermore, Streubel discloses that the nozzle is a pouring tube. Accordingly, Streubel fails to disclose the use of a spade-shaped immersion nozzle. As is known in the art of steel strand casting, any slight change in the configuration of the mold can have an effect on casting. Accordingly, there is no teaching or suggestion that a spade-shaped immersion nozzle can be used in Streubel.

Schrewe fails to teach or suggest what Streubel lacks. Schrewe discloses a mold for continuous casting of slabs wherein the cross section of the strand output of the mold has a bulge. However, as shown in Figs. 2 and 3 of Schrewe, the side surfaces of the broad faces of the mold do not taper to the side walls. Rather, the bulge or crowned section of each broad face ends at line 20 in Fig. 3, leaving a section of the broad face which does not taper between the center of the broad face and the narrow face. Furthermore, Schrewe also discloses that the nozzle for delivering melt to the mold is a pipe 2 (see Figs. 2 and 3; and col. 3, line 8) and therefore

fails to teach or suggest that the immersion nozzle is spade-shaped, as recited in independent claims 11 and 14.

In view of the above amendments and remarks, it is respectfully submitted that independent claims 11 and 14 are allowable over Streubel in view of Schrewe.

Dependent claims 12-13 and 15-22, being dependent on one of independent claims 11 and 14, are allowable for the same reasons as are independent claims 11 and 14.

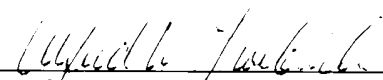
The application is now deemed to be in condition for allowance and notice to that effect is solicited.

It is believed that no fees or charges are required at this time in connection with the present application; however, if any fees or charges are required at this time, they may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,

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